POLAR BEAR TAGGING

CLYDE RIVER, N.W.T.

AUGUST 1980

Northwest Territories Resources, Wildlife & Economic Development

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J. LEE

N.W.T. WILDLIFE SERVICE

1982

Manuscript Report 7

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Government of the Northwest Territories.

ABSTRACT

During August, 1980, nine polar bears were captured, marked, and eight were released. One bear died. None of the bears had been previously captured. We were unable to locate a satellite transmitter lost from a bear in the spring of 1980. A suitable location for the erection of an observation tower was found at Cape Raper but the spring and winter concentration of bears at that site is unknown.

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INTRODUCTION

As part of an ongoing program to evaluate polar bear quotas, Baffin Island has been the focus of several polar bear research programs recently. The Canadian Wildlife Service (CWS) has completed work around southeastern Baffin Island (Stirling et al. 1980) and the NWT Wildlife Service has spent the last three years studying polar bears in Lancaster Sound (Schweinsburg et al. 1982). Harrington (1961) and Wooley (1979) conducted surveys along the east Baffin coast, south of Clyde River but, other than that, the area between Pond Inlet and Broughton Island has not been studied.

This paper describes the results of polar bear studies undertaken near Clyde River, NWT during the months of August and September, 1980. The objective was to mark bears and collect data for population analysis. Also, an attempt was made to locate satellite transmitters which had been placed on four bears during the spring of 1979. This was the second attempt as efforts made in the spring of 1980 were not successful (Lee and Schweinsburg 1982). We also hoped to find an area suitable for erecting an observation tower for behavioural and deterrent studies.

STUDY AREA

The Clyde area as designated here, includes the coastal and fiord regions from Clyde River southeast to Cape Henry Kater (Fig. 1). Harrington (1961) describes the area as follows: "From a geological viewpoint, the bedrock is largely composed of gneisses and granites of Precambrian age. Some surface debris in the area besides sediments on the coastal lowlands are of Pleistocene origin. Physiographically this northeastern portion of Baffin Island is characterized by steepsided fiords which result in deep southwesterly coastal indentations in the northern half of the area, while in the southern half, on Home Bay, these indentations are much less significant and have a more westerly orientation. The northern sector mentioned is fronted by a rather broad coastal lowland possessing numerous ponds and marshes, apparently a result of recent emergence from the sea. Behind this sedimentary plain, hills become more pronounced, until they rise to mountains reaching 1800 m in places. Glacial cover increases with altitude. Westward from the heads of the fiords the land decreases in height and flattens out, being strewn with glacial erratics and spotted with many ponds and lakes."

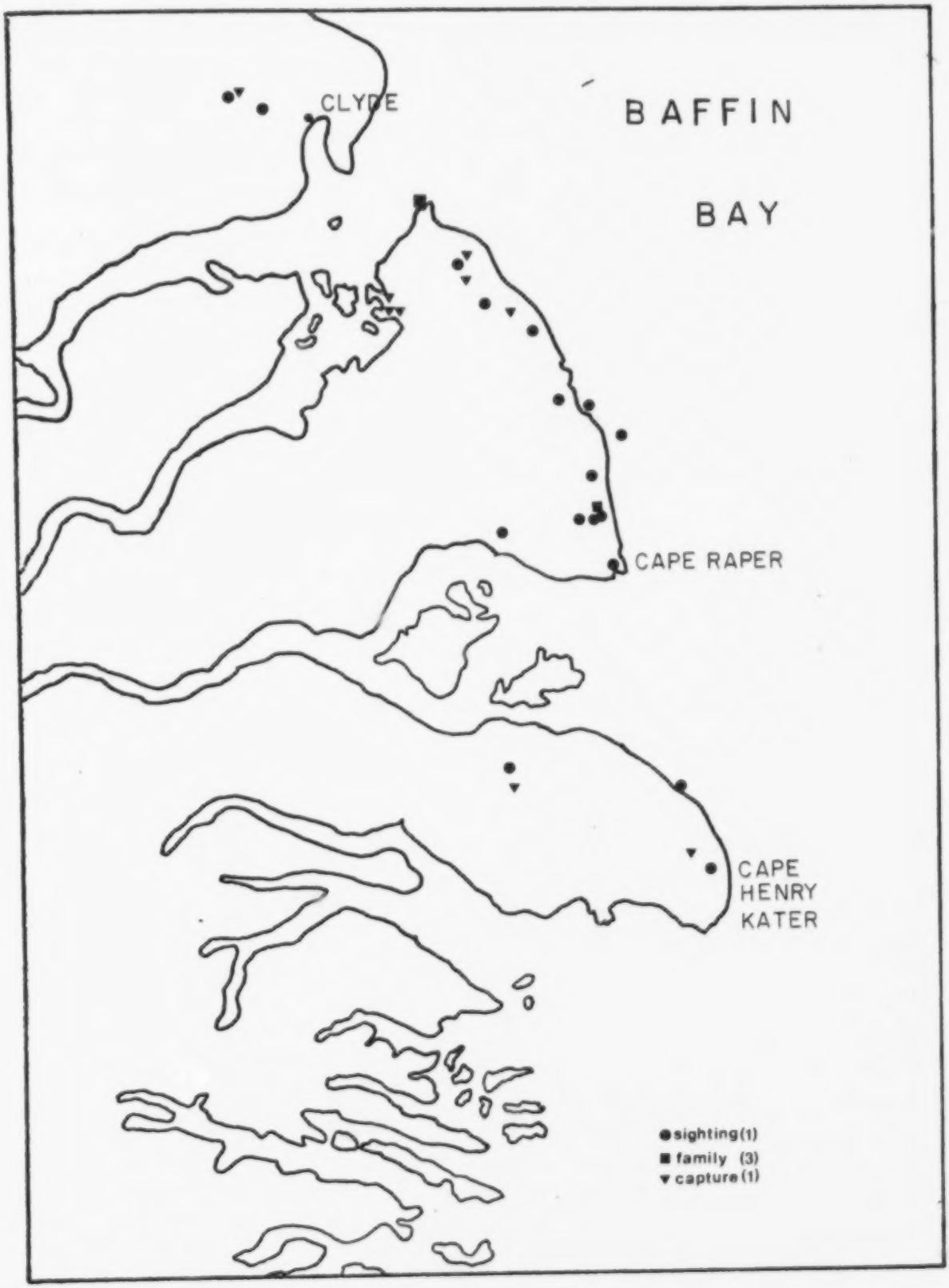

Figure 1. Study area and locations of polar bears captured or sighted during August and September, 1970

METHODS

We flew a total of 33.4 h during the study (Appendix A). Of these, only 10 were actually flown during tagging. From Clyde River, we used a Bell 206 helicopter to fly NW as far as Cape Eglinton and as far southeast as Cape Henry Kater. All the bears were located by visual scanning as tracking snow was non-existent. Search effort was concentrated on coastal plains and in the high rolling hills further inland. Although some time was spent flying along the beaches, bears which were sighted there were not captured due to the proximity to the ocean and associated wet low land. Once sighted, we attempted to direct the animal to dry ground. Any bears which were not responsive to herding with the helicopter were not drugged.

Drugging the bears was done with darts from the helicopter (Lentfer 1968) and immobilization was accomplished with carfentanil[1] at a standard dose of 5 mg per bear. Dr. J.C. Haigh, a veterinarian from The Western College of Veterinary Medicine, Saskatoon, Saskatchewan supplied the carfentanil and assisted in the tagging operation. Azaperone[2] was used in conjunction with carfentanil as a tranquilizer and to increase the respiration rate of drugged bears. A standard dose of 100 mg/bear was used.

Once polar bears were immobilized, they were marked with individually numbered polyurethane ear tags. Bears were also

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1 Carfentanil, Janssen Pharmaceutica, Beerse, Belgium

2 Azaperone, Jannssen Pharmaceutia, Beerse, Belgium

tattooed on the inside of both upper lips with a number corresponding to the ear tag number. Data recorded for each bear included weight, sex, total length, physical condition, heart rate, rectal temperature and respiration rate. The first premolar was pulled for age determination. All bears were painted with a number using Lady Clairol hair dye for subsequent identification from the air. Tetracycline, a wide spectrum antibiotic, was injected intramuscularly at a dosage of 7 mg/kg for subadult animals and 14 mg/kg for older bears. Blood was collected for determination of physical and chemical characteristics (Appendix B) and hair was collected for pesticide and heavy metal analyses (Appendix C).

Naloxone[3] and M5050[4] (diprenorphine) were used as antagonists to carfentanil enabling the bears to regain consciousness in a matter of minutes. The antagonists were administered by hand at the following doses: nalaxone; 40 mg intravenous, M5050; 2-3 mg intramuscularly.

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3 Naloxone, Cyanamid of Canada Ltd., Montreal, P.Q.

4 Revivon, Cyanamid of Canada Ltd., Montreal, P.Q.

RESULTS

Nine bears were captured, none of which had been caught previously. One bear was resighted after is was released. Locations of all sightings and captures are shown in Figure 1. Age and sex are listed in Table 1. No family groups were captured. Twenty-two bears were seen and not captured; 2 COY (cubs of the year), 2, 2-year-olds, 17 adults and, one subadult.

The bears reacted well to the immobilizing drug and no induction problems occurred. The mean time to tractibility was 5.4 ± 3.4 min (n=9) and the mean recovery time after injection of the antagonist was 5.0 ± 2.7 min (n=9). Mean heart rate was 56.3 ± 9.0 b/m (n=8); mean respiration rate was 4.5 ± 2.5 b/m (n=8); and the mean rectal temperature of drugged bears was 39.6 ± 0.9^{o}C (n=6). Drugging information is listed in detail in Appendix D. It became obvious after the second day that at least some of the bears were experiencing recycling of the drug resulting in complete or partial sedation about 20 h after the initial injection. At this time the tagging program was suspended. One bear died due to a combination of stress, overheating and recycling of the drug (Appendices E and F). After termination of tagging, several hours were spent looking for bears which might be experiencing recycling. One animal was found about 24 hrs after capture, lying on a snowbank near its capture site. The bear got up and walked unsteadily away when the helicopter approached.

On the ferry trip from Pond Inlet to Clyde River, approximately 30 minutes were spent in and around Buchan Gulf

Table 1. Age and sex of polar bears captured during August and September, 1980.

Bear No.	Age	Sex
X05280	03	M
X05281	05	M
X05282	06	F
X05284	07	F
X05285	04	M
X05286	09	M
X05287	05	F
X05288	05	M
X05289	04	F

searching for a satelite transmitter that had last been located in that area. The region was flown at altitudes between 900 and 1500 m. No signal was detected. It is most likely that the transmitter was on the ice and was lost when the ice broke up.

The area which appeared most suitable for an observation tower was the Cape Raper region. The stretch of land running from Cape Raper northwest for about 13 km is relatively flat with the exception of three distinct heights of land along the coast. The outcrop in the middle is about 152 m while the other two are approximately 120 m high. A tower placed on the central height would provide an unobstructed view for many kilometers in all directions. The area immediately east of this strip is relatively flat and could accomodate a twin otter. There is also an abundance of fresh water available. During the short time we were in the area there were always bears present at, or in the vicinity of, Cape Raper. Almost one third of the bears sighted were in this area. Although the Cape Raper region appeared the most suitable for locating an observation tower, more information about the winter and spring distribution of polar bears is required before any decision can be made.

ACKNOWLEDGEMENTS

We gratefully acknowledge the logistic support of the Polar Continental Shelf Project and the N.W.T. Wildlife Service (NWT-WS). Aiko Sutherland, NWT-WS, sectioned and aged the polar bear teeth, and Ellen Irvine, NWT-WS, typed and assisted in editing this manuscript. Special thanks to J. Haigh of the Western College of Veterinary Medicine for his assistance in the field and to B. Wooley, NWT-WS, for his support, cooperation, and hospitality during our stay in Clyde River.

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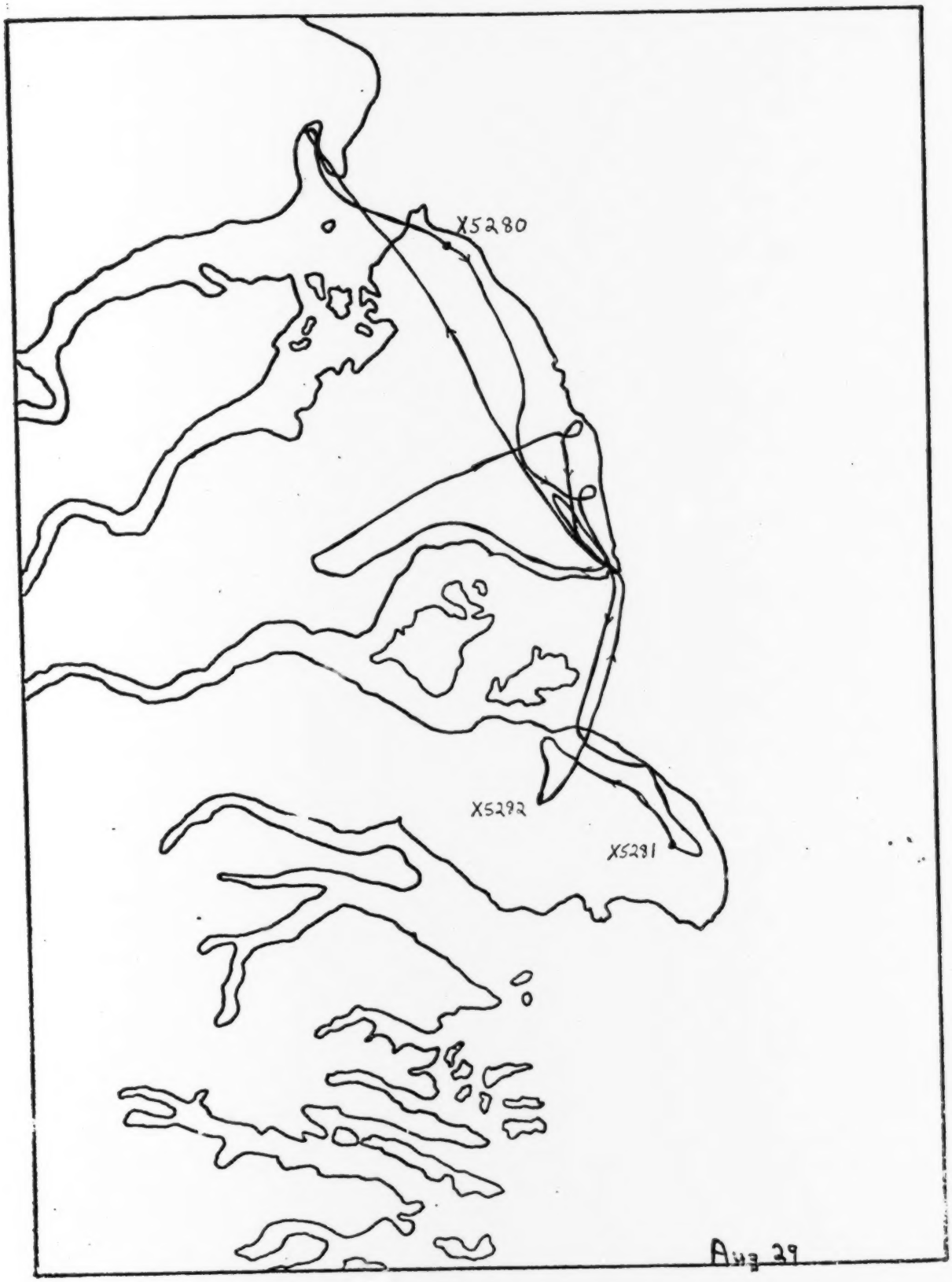
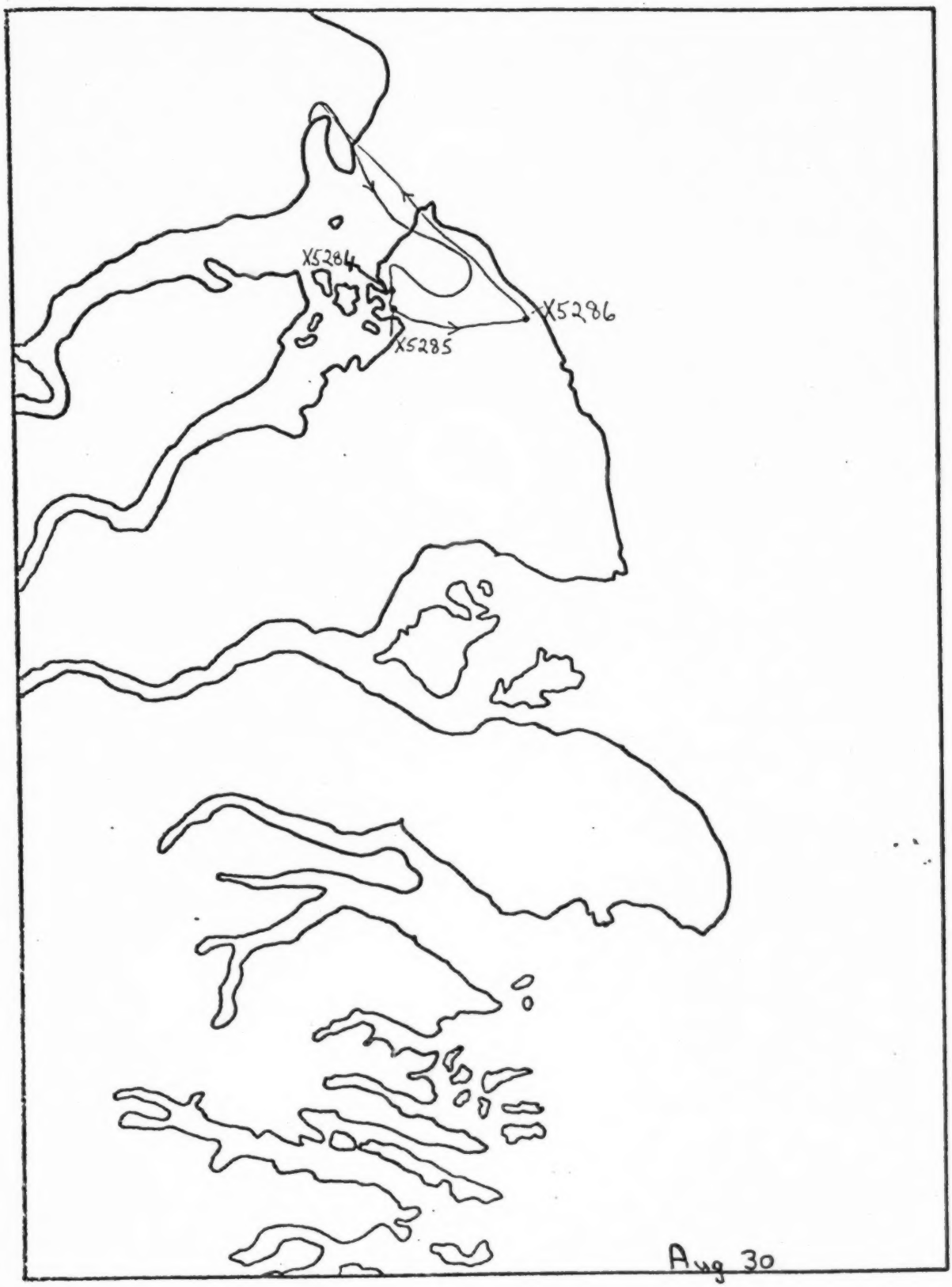
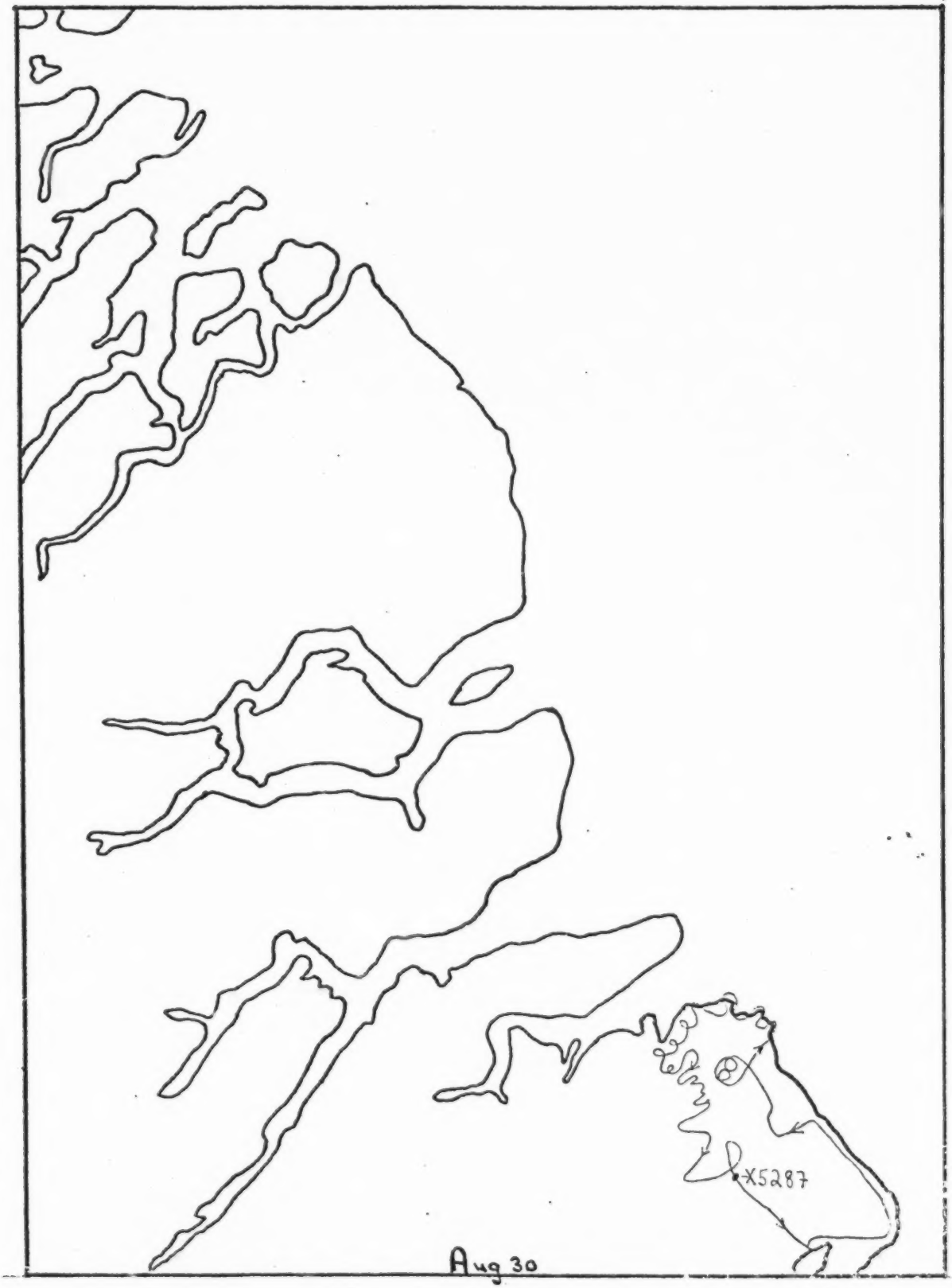
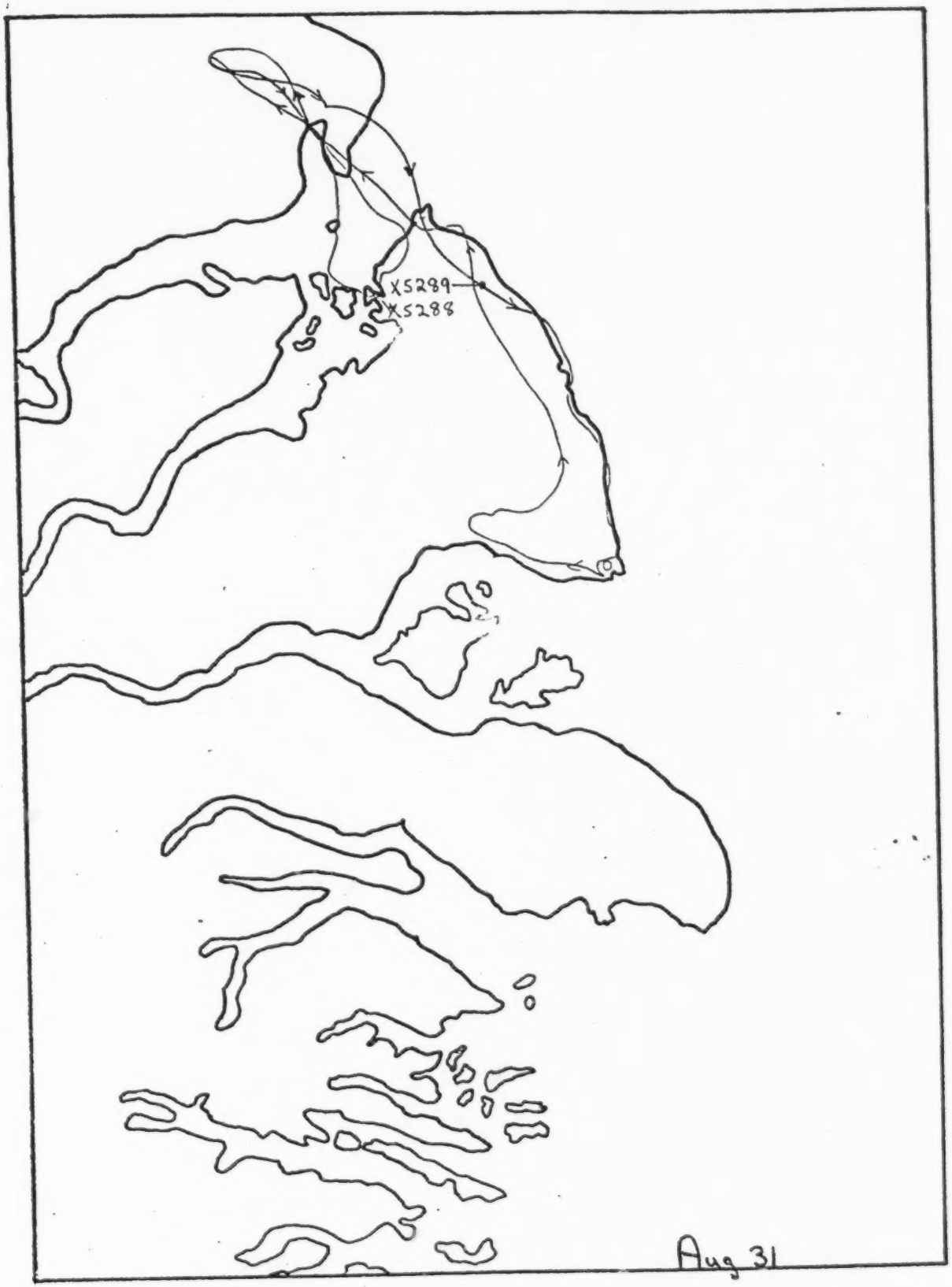
Appendix A. Daily flight maps. Polar bear tagging, Clyde River, fall 1980.


X5280
X5282
X5281
Aug 29


X5284
X5286
X5285
Aug 30


X5287
Aug 30


X5289
X5288
Aug 31

Appendix B. Results of analysis of blood from polar bears captured during August and September, 1980, near Clyde River.

University of Minnesota Polar Bear Blood Analysis, Fall, 1980

Analysis	Bear number						
	X5280	X5281	X5282	X5284	X5285	X5288	X5289
Glucose	110	207	142	154	148	179	123
BUN	23	15	36	23	12	15	11
Creatinine	1.1	1.4	1.3	2.4	1.3	1.6	1.7
T. Protein	7.2	7.1	5.5	6.9	7.0	6.9	6.5
Albumin	3.84	4.3	3.35	4.37	4.38	5.01	4.89
Globumin	3.36	2.8	2.15	2.53	2.62	1.89	1.61
A/G	1.1	1.5	1.6	1.7	1.7	2.7	3.0
% Alb	53.3	60.6	60.9	63.3	62.6	72.6	75.2
% α_1	6.6	6.2	10.7	4.4	2.7	3.9	2.7
% α_2	16.5	10.4	12.8	13.4	12.3	10.8	7.9
% B_1	11.4	14.2	9.3	8.9	10.6	7.7	6.9
% γ	12.2	8.6	6.3	10.0	11.8	5.0	3.3
Na	137	142	123	140	139	140	140
K	5.5	4.9	4.7	4.7	4.9	5.6	5.6
Ca	9.1	10.5	8.8	10.1	9.6	9.3	9.0
P	5.4	5.2	4.6	3.3	5.5	3.9	5.0
Ca/P	1.7	2.0	1.9	3.1	1.7	2.4	1.8
Mg	2.0	2.3	2.0	2.1	2.1	2.0	1.8
Cu	142	45	28	32	58	45	32
SGOT	26	45	37	25	56	50	37
SGPT	7	14	16	9	16	16	23
CPK	3	13	5	4	7	21	5
LDH	510	766	603	580	719	789	650
Alk. Phos.	0.7	1.8	1.1	0.8	1.6	1.5	0.8
Tot lipid	799	953	790	885	834	893	1038
Cholesterol	271	300	262	274	254	293	317
Gelman Electro HDL Chol	146	216	197	173	178	190	197
Sigma PPT HDL Chol	167	200	222	200	187	156	206

Appendix C. Results of mercury analysis of polar bear hair from bears captured during August and September 1980, near Clyde River.

Occupational Health Unit Laboratory
Medical Services Branch
Health and Welfare Canada

Mercury Analysis of Polar Bear Hair, Fall, 1980
(analysis, Oct. 27,1980)

Lab. no.	Bear no.	Total Hg (ppm)	Inorganic Hg (ppm)
1	X5280	4.4	0.5
2	X5281	4.7	1.4
3	X5282	5.3	0.5
4	X5284	5.6	0.7
5	X5285	4.2	--
6	X5286	4.0	--
7	X5287	5.8	0.8
8	X5288	5.0	0.4
9	X5289	5.3	0.5

Appendix D. Observation on polar bears administered intrasmuscular injections of carfentanil.

Bear number	Time to tractibility minutes	Time to recovery minutes	Heart rate b/m	Respiration rate b/m	Temperature Deg. Cent.
X5280	4:03	5:40	50	2	40.0
X5281	3:03	5:28	50	6	--
X5282	3:15	5:39	70	4	40.5
X5284	5:00	4:34	40	3	--
X5285	4:16	4:36	60	4	38.5
X5286	9:17	3:38	60	4	38.4
X5287	13:42	1:27	60	10	--
X5288	2:26	9:26	60	3	40.0
X5289	6:24	4:55	--	--	40.4
Mean	5.43±3.39	5.03±2.7	56.3±9.0	4.5±2.5	39.6±0.9

Appendix E. Report on death of polar bear X5287.

August 30, 1980... Following a 12 minute period of helicopter manouvering prior to darting, the animal was injected with carfentanil (5 mg), azaperone (200 mg), and hyaluronidase (180 mg). Injection was in the right shoulder. A second dart with the same dosage was given 13 minutes later as the bear was showing no signs of being drugged. Recumbent 1 minute later. Heart rate was 60 b/m and respiration was between 10 and 12 b/m during immobilization. After 40 minutes, naloxone (50 mg) and diprenorphine (6 mg) were administered. The bear was moving within 90 s but did not get up and move off like most bears. It sat up, moved its head but did not travel any more than 2-3 m before lying down again. It was left alone at 1720 h. The bear was checked at 1845 h. The animal had moved a few more meters but was lying quietly. When we arrived, it got up, moved a few more meters and lay down again.

August 31, 1980... Bear checked at 0900 h. Still had not moved very far, but was awake and mobile. Bear was again checked about 1400 h. Looked groggy. Still in same small area. Injected with deprenoriphine (10 mg) and naloxone (50 mg). After 15 min bear seemed more awake. Water was poured on bear from helicopter in an attempt to rehydrate and cool it. Snow was also dropped close by. Bear got up and moved off 20-30 m. Sat up and watched us reload helicopter. Moved on its own without being harrassed. Appeared to be recovering.

September 1, 1980... Bear checked at 0430 h. Had moved to bottom of slope. Lying down. Did not look good. Would not get up. Checked again at 1330 h.. Dead. Still warm. Moved it to a level spot for skinning. Thick incoming fog necessitated departure. Returned to Clyde. Notified HTA.

September 2, 1980... Returned with Inuk to skin bear.

Appendix F. Final Postmortum and Pathology report on polar bear (X5287) killed during handling.

Postmortum examination carried out in field

Animal in fat condition (3/5). Fat thickness measured over rump 5 cm, flank 7 cm, shoulder blade 3 cm, and belly 5 cm. Large quantities of fat in abdomen. Inuk skinning the animal stated that the fat was greasier than usual. Two cm diameter of blackened fat over right shoulder blade at site of dart. No visible lesion in underlying muscle.

Alimentary Canal

Small quantity of mucoid material in pharynx and oesophagus, stomach, small intestine and proximal portion of large intestine contained viscid mucoid material. Colon and rectum contained remnants of seal. No lesions visible in G.I. tract.

Respiratory Tract

Trachea normal, a few mucoid globs similar to those in G.I. tract present. Animal in dorsal recumbency. Lungs collapsed, firm to feel, dorsal areas very dark (almost black), more ventral areas normal in appearance.

Cardio-Vascular

Heart, petechiae over coronary grooves and purplish areas in

muscles of left vetricle. Ventricles and auricles contained almost no blood.

Ecchymoses on both left and right parietal pleural surfaces.

Kidneys (multi-lobular)

Soft and mushy in consistency, no visible haemorrhages.

Liver, gallbladder, pancreas, uterus, urinary bladder normal.

Muscles

Longitudinal section of numerous muscles normal in appearance, with exception of psoas which had soft area in middle of its length on one side.

Brain

Normal.

J.C. Haigh

Western College of Veterinary Medicine, Saskatoon, Saskatchewan
Final Pathology Report # N80-4155

September 12, 1980

Polar Bear

5 yrs

Female

240 kg

Id. #X5287

Tissue submitted: lung, muscle, liver, heart, kidney, and brain.

Pathological Diagnosis: 1) Pulmonary congestion and edema

2) Muscle - parasitism (sarcocystis)

Etiologic Diagnosis

Comments:

The only histological lesion of significance was pulmonary edema. Occasional hemosiderinophages were present in the lung suggesting the congestion had been of some duration but morpholgic lesions were found in the heart. The single sarcosyst found in the skelatal muscle is incidental. There was no evidence of myopathy present.

I. Wilkie, B.V.Sc
September 29, 1980